

SCIENCE

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ADDRESS OF THE PRESIDENT BEFORE THE SOCIETY FOR PSYCHICAL RESEARCH.*

THE Presidency of the Society for Psychical Research resembles a mousetrap. Broad is the path and wide the way that leadeth thereinto. Flattering bait is spread before the entrance: The distinguished names of one's predecessors in the office; the absence of any active duties; England and America symbolically made one in that higher republic where no disputed frontiers or foreign offices exist; and all the rest of it. But when the moment comes to retrace one's steps and go back to private life, like Cincinnatus to his plough, then comes the sorrow, then the penalty for greatness. The careless presidential mouse finds the wires all pointing against him, and to get out there is no chance, unless he leave some portion of his fur. So in resigning my office to my worthier successor, I send this address to be read across the ocean as my ransom, not unaware, as I write it, that the few things I can say may well fall short of the dignity of the occasion and the needs of the cause for which our Society exists.

Were psychical research as well organized as the other sciences are, the plan of a presidential address would be mapped out in advance. It could be nothing but a report

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Prof. J. McKeen Cattell, Garrison-on-Hudson, N. Y.

* Read at the Annual Meeting of the Society in London on January 31st, 1896, and also at meetings of the American Branch in Boston on January 31st and New York on February 1st, 1896.

of progress, an account of such new observations and new conceptions as the interim might have brought forth. But our active workers are so few compared with those engaged in more familiar departments of natural learning, and the phenomena we study so fortuitous and occasional, that two years must, as a rule, prove too short an interval for regular accounts of stock to be taken. Looking back, however, on our whole dozen years or more of existence, one can appreciate what solid progress we have made. Disappointing as our career has doubtless been to those of our early members who expected definite corroboration or the final *coup de grâce* to be given in a few short months to such baffling questions as that of physical mediumship, to soberer and less enthusiastic minds the long array of our volumes of *Proceedings* must suggest a feeling of anything but discouragement. For here, for the first time in the history of these perplexing subjects, we find a large collection of records, to each of which the editors and reporters have striven to attach its own precise coefficient of evidential value, great or small, by getting at every item of first-hand evidence that could be attained, and by systematically pointing out the gaps. Only those who have tried to reach conclusions of their own by consulting the previous literature of the occult, as vague and useless, for the most part, as it is voluminous, can fully appreciate the immense importance of the new method which we have introduced. Little by little, through consistently following this plan, our *Proceedings* are extorting respect from the most unwilling lookers-on; and I should like emphatically to express my hope that the impartiality and completeness of record which has been their distinguishing character in the past will be held to even more rigorously in the future. It is not as a vehicle of conclusions of our own, but as a

collection of documents that may hereafter be resorted to for testing the conclusions and hypotheses of *anybody*, that they will be permanently important. Candor must be their very essence, and all the hesitations and contradictions that the phenomena involve must appear unmitigatedly in their pages. Collections of this sort are usually best appreciated by the rising generation. The young anthropologists and psychologists who will soon have full occupancy of the stage will feel, as we have felt, how great a scientific scandal it has been to leave a great mass of human experience to take its chances between vague tradition and credulity on the one hand and dogmatic denial at long range on the other, with no body of persons extant who are willing and competent to study the matter with both patience and rigor. There have been isolated experts, it is true, before now. But our Society has for the first time made their abilities mutually helpful.

If I were asked to give some sort of dramatic unity to our history, I should say first that we started with high hopes that the hypnotic field would yield an important harvest, and that these hopes have subsided with the general subsidence of what may be called the hypnotic wave. Secondly, I should say that experimental thought-transference has yielded a less abundant return than that which in the first year or two seemed not unlikely to come in. Professor Richet's supposition that if the unexplained thing called thought-transference be ever real, its causes must, to some degree, work in everybody at all times (so that in any long series of card-guessings, for example, there ought always to be some excess of right answers above the chance number) is, I am inclined to think, not very well substantiated. Thought-transference may involve a critical point, as the physicists call it, which is passed only when certain psychic conditions are realized, and otherwise

not reached at all—just as a big conflagration will break out at a certain temperature, below which no conflagration whatever, whether big or little, can occur. We have published records of experiments on at least thirty subjects, roughly speaking, and many of these were strikingly successful. But their types are heterogeneous; in some cases the conditions were not faultless; in others the observations were not prolonged; and generally speaking, we must all share in a regret that the evidence, since it has reached the point it *has* reached, should not grow more voluminous still. For whilst it cannot be ignored by the candid mind, it yet, as it now stands, may fail to convince coercively the skeptic. Any day, of course, may bring in fresh experiments in successful picture guessing. But meanwhile, and lacking that, we can only point out that our present data are strengthened in the flank, so to speak, by all observations that tend to corroborate the possibility of other kindred phenomena, such as telepathic impression, clairvoyance, or what is called ‘test-mediumship.’ The wider genus will naturally cover the narrower species with its credit.

Now, as regards the work of the Society in these latter regards, we can point to solid progress. First of all we have that masterpiece of intelligent and thorough scientific work—I use my words advisedly—the Sidgwick Report on the Census of Hallucinations. Against the conclusion of this report, that death apparitions are 440 times more numerous than they should be according to chance, the only rational answer that I can see is that the data are still too few, that the net was not cast wide enough, and that we need, to get fair averages, far more than 17,000 answers to the Census question. This may, of course, be true, though it seem exceedingly unlikely, and in our own 17,000 answers veridical cases may have heaped themselves unduly.

So neither by this report then, taken alone, is it absolutely necessary that the skeptic be definitely convinced. But then we have, to strengthen *its* flank in turn, the carefully studied cases of ‘Miss X.’ and Mrs. Piper, two persons of the constitution now coming to be nicknamed ‘psychic’ (a bad term, but a handy one), each person of a different psychic type, and each presenting phenomena so chronic and abundant that, to explain away the supernormal knowledge displayed, the disbeliever will certainly rather call the subjects deceivers, and their believers dupes, than resort to the theory of chance-coincidence. The same remark holds true of the extraordinary case of Stainton Moses, concerning which Mr. Myers has recently given us such interesting documents. In all these cases (as Mr. Lang has well said of the latter one) we are, it seems to me, fairly forced to choose between a physical and a moral miracle. The physical miracle is that knowledge may come to a person otherwise than by the usual use of eyes and ears. The moral miracle is a kind of deceit so perverse and successful as to find no parallel in usual experience. But the limits of possible perversity and success in deceit are hard to draw; so here again the skeptic may fall back on his general *non possumus*, and without pretending to explain the facts in detail, say the presumption from the ordinary course of Nature holds good against their supernormal interpretation. But the oftener one is forced to reject an alleged sort of fact, by the method of falling back on the mere presumption that it can’t be true because, so far as we know Nature, Nature runs altogether the other way, the weaker does the presumption itself get to be; and one might in course of time use up one’s presumptive privileges in this way, even though one started (as our anti-telepathists do) with as good a case as the great induction of psychology that all our knowl-

edge comes by the use of our eyes and ears and other senses. And we must remember also that this undermining of the strength of a presumption by reiterated report of facts to the contrary does not logically require that the facts in question should all be well proved. A lot of rumors in the air against a business man's credit, though they might all be vague, and no one of them amount to proof that he is unsound, would certainly weaken the *presumption* of his soundness. And all the more would they have this effect if they formed what our lamented Gurney called a faggot and not a chain, that is, if they were independent of each other, and came from different quarters. Now our evidence for telepathy, weak and strong, taken just as it comes, forms a faggot and not a chain. No one item cites the content of another item as part of its own proof. But, taken together, the items have a certain general consistency; there is a method in their madness, so to speak. So each of them adds presumptive value to the lot; and cumulatively, as no candid mind can fail to see, they subtract presumptive force from the orthodox belief that there can be nothing in any one's intellect that has not come in through ordinary experiences of sense.

But it is a miserable thing for a question of truth to be confined to mere presumption and counter-presumption, with no decisive thunderbolt of fact to clear the baffling darkness. And sooth to say, in talking so much of the merely presumption-weakening value of our records, I have been wilfully taking the point of view of the so-called 'rigorously scientific' disbeliever, and making an *ad hominem* plea. My own point of view is different. For me the thunderbolt *has* fallen, and the orthodox belief has not merely had its presumption weakened, but the truth itself of the belief is decisively overthrown. If you will let me use the language of the professional logic shop, a

universal proposition can be made untrue by a particular instance. If you wish to upset the law that all crows are black, you mustn't seek to show that no crows are; it is enough if you prove one single crow to be white. My own white crow is Mrs. Piper. In the trances of this medium, I cannot resist the conviction that knowledge appears which she has never gained by the ordinary waking use of her eyes and ears and wits. What the source of this knowledge may be I know not, and have not the glimmer of an explanatory suggestion to make; but from admitting the fact of such knowledge, I can see no escape. So when I turn to the rest of our evidence, ghosts and all, I cannot carry with me the irreversibly negative bias of the rigorously scientific mind, with its presumption as to what the true order of nature ought to be. I feel as if, though the evidence be flimsy in spots, it may nevertheless collectively carry heavy weight. The rigorously scientific mind may, in truth, easily overreach itself. Science means, first of all, a certain dispassionate method. To suppose that it means a certain set of results that one should pin one's faith upon and hug forever is sadly to mistake its genius, and degrades the scientific body to the status of a sect.

But I am devoting too many words to scientific logic, and too few to my review of our career. In the question of physical mediumship, we have left matters as baffling as we found them, neither more nor less. For if, on the one hand, we have brought out new documents concerning the physical miracles of Stainton Moses, on the other hand we have, by the Hodgson-Davey experiments, and the Paladino episode, very largely increased the probability that testimony based on certain sorts of observation may be quite valueless as proof. Eusapia Paladino has been to us both a warning and an encouragement: an encouragement to pursue unwaveringly the rigorous method

in such matters from which our *Proceedings* have never departed, and a warning against drawing any prompt inference whatever from things that happen in the dark. The conclusions to which some of us had been hastily led on 'the Island,' melted away when, in Cambridge, the opportunity for longer and more cunning observation was afforded. Some day, it is to be hoped, our *Proceedings* may be enabled to publish a complete study of this woman's life. Whatever the upshot of such a study, few documents could be more instructive in all ways for psychical research.

It is pleasant to turn from phenomena of dark-sitting and rathole type (with their tragi-comic suggestion that the whole order of nature might possibly be overturned in one's own head, by the way in which one imagined oneself, on a certain occasion, to be holding a tricky peasant woman's feet) to the 'calm air of delightful studies.' And on the credit side of our Society's account a heavy entry must next be made in favor of that immense and patient collecting of miscellaneous first-hand documents that alone has enabled Mr. Myers to develop his ideas about automatism and the subliminal self. In Mr. Myers' papers on these subjects we see, for the first time in the history of men's dealings with occult matters, the whole range of them brought together, illustrated copiously with unpublished contemporary data, and treated in a thoroughly scientific way. All constructions in this field must be provisional, and it is as something provisional that Mr. Myers offers us his attempt to put order into the tangle. But, thanks to his genius, we begin to see for the first time what a vast interlocked and graded system these phenomena, from the rudest motor automatisms to the most startling sensory apparition, form. Mr. Myers' methodical treatment of them by classes and series is the first great step towards overcoming the distaste of orthodox science to look at them at all.

But our *Proceedings* contain still other veins of ore for future working. Ghosts, for example, and disturbances in haunted houses. These, whatever else may be said of them at present, are not without bearing on the common scientific presumption of which I have already perhaps said too much. Of course, one is impressed by such narratives after the mode in which one's impressibility is fashioned. I am not ashamed to confess that in my own case, although my *judgment* remains deliberately suspended, my *feeling* towards the way in which the phenomena of physical mediumship should be approached has received from ghost and disturbance stories a distinctly charitable lurch. Science may keep saying: "such things are simply impossible;" yet, so long as the stories multiply in different lands, and so few are positively explained away, it is bad method to ignore them. They should at least accrete for future use. As I glance back at my reading of the past few years (reading accidental so far as these stories go, since I have never followed up the subject) ten cases immediately rise to my mind. The Phelps case at Andover, recorded by one of the family, in *McClure's Magazine* for this month; a case in China, in Nevius's *Demon Possession*, published last year; the case in John Wesley's life; the 'Amherst Mystery' in Nova Scotia (New York, 1888); the case in Mr. Willis's house at Fitchburg, recorded in *The Atlantic Monthly* for August, 1868 (XXII., 129); the Telfair-Mackie case, in Sharpe's *History of Witchcraft* in Scotland; the Morse case, in Upham's *Salem Witchcraft*; the case recounted in the introduction of W. v. Humboldt's *Brief an eine Freundin*; a case in the *Annales des Sciences Psychiques* for last year (p. 86); the case of the carpenter's shop at Swanland, near Hull, in our *Proceedings*, Vol. VII., Part XX., pp. 383-394. In all of these, if memory doesn't deceive me, material objects are

said to have been witnessed by many persons moving through the air in broad daylight. Often the objects were multitudinous; in some cases they were stones showered through windows and down-chimney. More than once it was noted that they fell gently and touched the ground without shock. Apart from the exceptionality of the reputed occurrences, their mutual resemblances suggest a natural type, and I confess that until these records, or others like them, are positively explained away, I cannot feel (in spite of such vast amounts of detected fraud) as if the case against physical mediumship itself as a freak of nature were definitively closed. But I admit that one man's psychological reaction cannot here be like unto another's; and one great duty of our Society will be to pounce upon any future case of this 'disturbance' type, catch it while red-handed and nail it fast, whatever its quality be.

We must accustom ourselves more and more to playing the rôle of a meteorological bureau, be satisfied for many a year to go without definitive conclusions, confident that if we only keep alive and heap up data, the natural types of them (if there are any) will surely crystallize out; whilst old material that is baffling will get settled as we proceed, through its analogy with new material that will come with the baffling character removed.

But I must not weary your patience with the length of my discourse. One general reflection, however, I cannot help asking you to let me indulge in before I close. It is relative to the influence of psychical research upon our attitude towards human history. Although, as I said before, Science taken in its essence should stand only for a method, and not for any special beliefs, yet, as habitually taken by its votaries, Science has come to be identified with a certain fixed general belief, the belief that the deeper order of Nature is mechanical ex-

clusively, and that non-mechanical categories are irrational ways of conceiving and explaining even such a thing as human life. Now this mechanical rationalism, as one may call it, makes, if it becomes one's only way of thinking, a violent breach with the ways of thinking that have, until our own time, played the greatest part in human history. Religious thinking, ethical thinking, poetical thinking, teleological, emotional, sentimental thinking, what one might call the personal view of life to distinguish it from the impersonal and mechanical, and the romantic view of life to distinguish it from the rationalistic view, have been, and even still are, outside of well-drilled scientific circles, the dominant forms of thought. But for mechanical rationalism, personality is an insubstantial illusion; the chronic belief of mankind, that events may happen for the sake of their personal significance, is an abomination; and the notions of our grandfathers about oracles and omens, divinations and apparitions, miraculous changes of heart and wonders worked by inspired persons, answers to prayer and providential leadings, are a fabric absolutely baseless, a mass of sheer untruth. Now, of course, we must all admit that the excesses to which the romantic and personal view of Nature may lead, if wholly unchecked by impersonal rationalism, are direful. Central African Mumbo-jumboism in fact is one of unchecked romanticism's fruits. One ought accordingly to sympathize with that abhorrence of romanticism as a sufficient world theory; one ought to understand that lively intolerance of the least grain of romanticism in the views of life of other people, which are such characteristic marks of those who follow the scientific professions to-day. Our debt to Science is literally boundless, and our gratitude for what is positive in her teachings must be correspondingly immense. But our own *Proceedings* and *Journals* have,

it seems to me, conclusively proved one thing to the candid reader, and that is that the verdict of pure insanity, gratuitous of preference for error, of superstition without an excuse, which the scientists of our day are led by their intellectual training to pronounce upon the entire thought of the past, is a most shallow verdict. The personal and romantic view of life has other roots besides wanton exuberance of imagination and perversity of heart. It is perennially fed by *facts of experience*, whatever the ulterior interpretation of those facts may prove to be; and at no time in human history would it have been less easy than now, at most times it would have been much more easy, for advocates with a little industry to collect in its favor an array of contemporary documents as good as those which our publications present. These documents all relate to real experiences of persons. These experiences have three characters in common: They are capricious, discontinuous and not easily controlled; they require peculiar persons for their production; their significance seems to be wholly for personal life. Those who preferentially attend to them, and still more those who are individually subject to them, not only easily *may* find, but are logically bound to find, in them valid arguments for their romantic and personal conception of the world's course. Through my slight participation in the investigations of the Society for Physical Research, I have become acquainted with numbers of persons of this sort, for whom the very word Science has become a name of reproach, for reasons that I now both understand and respect. It is the intolerance of Science for such phenomena as we are studying, her peremptory denial either of their existence, or of their significance except as proofs of man's absolute innate folly, that has set Science so apart from the common sympathies of the race. I confess that it is on this, its

humanizing mission, that our Society's best claim to the gratitude of our generation seems to me to depend. We have restored continuity to history. We have shown some reasonable basis for the most superstitious aberrations of the foretime. We have bridged the chasm, healed the hideous rift that Science, taken in a certain narrow way, has shot into the human world.

I will even go one step further. When from our present advanced standpoint we look back upon the past stages of human thought, whether it be scientific thought or theological thought, we are amazed that a Universe which appears to us of so vast and mysterious a complication should ever have seemed to any one so little and plain a thing. Whether it be Descartes' world or Newton's; whether it be that of the materialists of the last century or that of the Bridgewater treatises of our own; it always looks the same to us—incredibly perspectiveless and short. Even Lyell's, Faraday's, Mill's and Darwin's consciousness of their respective subjects are already beginning to put on an infantile and innocent look. Is it then likely that the Science of our own day will escape the common doom, that the minds of its votaries will never look old-fashioned to the grandchildren of the latter? It would be folly to suppose so. Yet, if we are to judge by the analogy of the past, when our Science once becomes old-fashioned, it will be more for its omissions of fact, for its ignorance of whole ranges and orders of complexity in the phenomena to be explained, than for any fatal lack in its spirit and principles. The spirit and principles of Science are mere affairs of method; there is nothing in them that need hinder Science from dealing successfully with a world in which personal forces are the starting-point of new effects. The only form of thing that we directly encounter, the only experience that we concretely have, is our own personal life.

The only complete category of our thinking, our professors of philosophy tell us, is the category of personality, every other category being one of the abstract elements of that. And this systematic denial, on Science's part, of personality as a condition of events, this rigorous belief that in its own essential and innermost nature our world is a strictly impersonal world, may, conceivably, as the whirligig of time goes round, prove to be the very defect that our descendants will be most surprised at in our own boasted Science, the omission that, to their eyes, will most tend to make it look perspectiveless and short.

But these things lie upon the knees of the gods. I must leave them there, and close now this discourse, which I regret that I could not make more short. If it has made you feel that (however it turn out with modern Science) our own Society, at any rate, is not 'perspectiveless,' it will have amply served its purpose; and the next President's address may have more definite conquests to record.

WILLIAM JAMES.

THE FORM OF THE HEAD AS INFLUENCED BY GROWTH.

THE change in the shape of the head which accompanies growth has been but very slightly investigated either in this country or abroad. The meagreness of results may be indicated by the fact that Topinard's *Éléments d' Anthropologie* contains only a note upon the subject, with no data.* A recent investigation upon the students of the Massachusetts Institute of Technology may be of interest as bearing upon this question. The measurements covered 485 students, grouped as follows: 215 in the first-year class; 69 in the second; 66 in the third, and 136 in the graduating class.

From the comparison of the measurements of the length and breadth of the heads

of these students so divided into classes, it appears that between the period of entrance and of graduation, that is to say from the ages of 18-19 to 23-24 years, the development of the head is almost entirely in respect of its length. The average breadth of the head remaining constant at or near 152 mm., the length varies from an average of 195.13 mm. in the first-year to 196.35 in the fourth-year class. The intermediate classes occupy a position midway between the two, indicating that this is not a result of chance. If this tendency be a general one, it means that the cephalic index in our American population of this class tends to decrease at this particular time of life. The cephalic index, for example, of the first-year students averages 78.6 and that of the fourth-year averages 77.2, the second and third years being 77.7. This is rendered specially significant by the fact that Drs. West and Porter have shown a slight decrease of cephalic index in American school children between the ages of 5 and 18; at Worcester, for example, the average index falling between 79 and 78.* If we assume that in both cases we are dealing with similar populations the hypothesis of a progressive decrease of cephalic index, with growth, of our American people would seem to be well founded.

In Europe, Zuckerhandl, comparing the index of 156 children and 197 adults of the same (Austrian) race, found that the children were narrower-headed than adults as a rule; and Holl confirms this result.† Dr. Meis declares that from his experience the children among the Germans are more dolicho-cephalic than the adults.‡ Schaafhausen finds that in many cases the length

* Archiv für Anthropologie, XXII., pp. 19 and 34; and Report of Anthropological Congress at Chicago, p. 57.

† Mitt. der Anth. Gesell. in Wien. XIV., 1884., p. 127; and *Ibid* XVIII., p. 4.

‡ *Ibid*, XX., 1890, p. 39 seq.

* Page 374.

of the head is attained before the full breadth.* In Italy, Dr. Livi has brought together the results of a number of observers from both northern and southern Europe, but all of them from the broad-headed races.† The difference of cephalic index on the average among 447 cases here amounts to one unit in favor of broad-headedness of the adult, the contrary tendency to that noted for the Americans. That age brings a relative increase in the breadth of the head was also apparently indicated by the few measurements made by Welcker.‡ For Bohemia, Dr. Matiegka, from measurements on 400 children, asserted that there is no tendency toward a change in the relative length and breadth in the cases observed by him.§ Dr. Boas finds that in the North American Indians age is characterized by a relative increase in the length.||

On the whole, summarizing the results and opinions of these various writers, whose conclusions are, on the whole, contrary to our American ones, it appears that no universal rule can be established with respect to the effect of age upon the proportions of the head. The only hypothesis which seems to be confirmed by all this evidence is that development brings an approximation to the racial type most clearly marked in the adult. In other words, in the narrow-headed races, like our own, the children are broader-headed than the adults. Among the brachy-cephalic races, such as those instanced by Dr. Livi and most of the others cited, the children exhibit the race peculiarity in a less marked degree, that is, they are relatively narrower headed than

* Über die Urform des Menschlichen Schädels, in report of Congres Int. d'Anth. et d'Archæologie, Paris, 1867.

† 'L'Indice Cefalico degli Italiani,' Florence, 1886, p. 15.

‡ Archiv. für Anthropologie, I., p. 151.

§ Mitt. der Anth. Gesell. in Wien, XXII., 1892, Sitzungsberichten, p. 81.

|| Verh. der Berliner Gesell. für Anth., Sitz. ber. May 18, 1895, p. 392.

at maturity. Finally the change from childhood to maturity becomes *nil* where the adults themselves belong to a group with a cephalic index near the mean for the entire European race. No relation can be established between the intelligence and the proportions of the head so far as the experience of European study goes, although Krause and Virchow declare in favor of the broad-headed type. If this hypothesis be true that age brings the fuller development of the race type, it may be possible in the future to apply a correction to the comparative results obtained by students of anthropology whose results are drawn from the study of children. But until that time the inferences to be drawn from such study are as likely to be erroneous as are conclusions drawn from the study of the color of the hair and eyes of school children, since in both cases maturity brings a change which has not as yet been statistically measured. It is earnestly hoped that further study along this line may be undertaken. The testimony of expert psychologists would be also of interest as bearing upon this point. In the hope of stimulating some such investigations, the modest results obtained from this study at the Institute of Technology are submitted.

W. Z. RIPLEY.

IS THE PUMPKIN AN AMERICAN PLANT?*

IN the Index Kewensis seventeen species of the genus *Cucurbita* are recognized and their distribution given as follows:

<i>C. bononiensis.</i>	Hab.?	<i>C. maxima.</i>	As. trop. Orb.
<i>C. californica.</i>	Am. bor. oce		trop. cult.
<i>C. ciceraria.</i>	Chili.	<i>C. medullaris.</i>	Hab.
<i>C. digitata.</i>	N. Mexic.	<i>C. melanæformis.</i>	Japon.
<i>C. ficifolia.</i>	As. or.	<i>C. moschata.</i>	As. trop.
<i>C. fetidissima.</i>	Mexic.	<i>C. palmata.</i>	Calif.
<i>C. Galeottii.</i>	Mexic.	<i>C. Pepo.</i>	Oriens. Afr. trop.
<i>C. hieroglyphica.</i>	Hab.?	<i>C. purpurea.</i>	Java.
<i>C. lignosa.</i>	Am. austr.	<i>C. radicans.</i>	Mexic.

* Substance of a lecture before University Archeological Association, Feb. 19, 1896.

According to the Index the two most important cultivated forms, *Cucurbita Pepo* and *C. maxima*, are looked upon as being natives of the eastern hemisphere and not of the western. Naudin, who made a careful and painstaking study of the cucurbits, is not so dogmatic. He says:* "De ces six espèces, trois sont alimentaires et cultivées depuis longtemps en Europe: ce sont *C. maxima*, *Pepo* et *moschata*, dont la patrie première est inconnue L'une d'entre elles, le *C. Pepo*, a peut-être été connue des Romains et des Grecs." De Candolle says† in relation to the original home of *Cucurbita maxima*: "Finally, without placing implicit faith in the indigenous character of the plant on the banks of the Niger, based upon the assertion of a single traveller, I still believe that the species is a native of the Old World and introduced into America by Europeans." In connection with this statement, the French botanist reviews the paper of Gray and Trumbull‡ and dissents from their views, because they were not based upon the observations of Naudin concerning the distinction existing between *C. maxima* and *C. Pepo*. The original home of *Cucurbita maxima* and *C. Pepo*, as far as I can discover from a cursory examination of the literature, is still doubtful, the Index Kewensis, however, throwing the weight of its influence towards an eastern origin. De Candolle* believes that *Cucurbita Pepo* is an American plant. He says: "Botanical indications are, therefore, in favor of a Mexican or Texan origin." "Thus historical data do not gainsay the opinion of an American origin, but neither do they adduce anything in support of it."

* NAUDIN, *Annales des Sciences Naturelles*, 4 Ser. VI., 15 ff.

†1885, DE CANDOLLE, *Origin of Cultivated Plants*, p. 253.

‡1883. GRAY AND TRUMBULL, *American Journal of Science*, p. 372.

According to Nuttall,* the Indians along the whole upper Missouri half a century ago were cultivating *C. verrucosa*. This common squash is according to Naudin a variety of *C. Pepo*, as is also *C. aurantia* (the *C. Texana* or *C. ovifera* of Gray), which has every appearance of being indigenous in the western part of Texas, on the Rio Colorado and upper tributaries. At least, this is the opinion of Mr. Lindheimer and Mr. Charles Wright, two good judges.

In looking over the plant materials collected in the undoubted prehistoric cliff dwellings of the Mancos Cañon, Colorado, and in identifying the vegetal specimens, as far as the material permitted, I became much interested in the seeds of some cucurbitaceous plant, which looked familiarly like those of the pumpkin. I was not satisfied, however, of this until I had made a somewhat detailed histological study. This was the more necessary, because the utmost confusion seems to reign as to the specific limits of several of the more interesting cultivated forms. There is not a group of plants the synonymy of which is more confused than that of the Cucurbits. Harz† and Borbas‡ give somewhat detailed descriptions of the anatomy of the seeds of *Cucurbita maxima* and *Pepo*, the former from an agricultural standpoint, the latter from a botanical. On comparing the seeds found in the cliff dwelling exhibit with the descriptions of both investigators, it was found that in every respect the seeds were those of the pumpkin *Cucurbita Pepo*. Space will not permit a detailed account of this investigation, but the results obtained indisputably prove that the pumpkin is a native of America. It is fortunate that the seeds were obtained from the ruins

* GRAY, *Scientific Papers*, I., p. 85.

† 1885, HARZ, *Landwirthschaftliche Samenkunde*, p. 795, 811.

‡ 1880, BORBAS VINCZE, *Földművelési Erde Keink*, No. 52, quoted in *Botanische Centralblatt*, VIII. (?)

of a people who had no contact with Europeans, but who were undoubtedly pre-Columbian. Nor does the evidence of the American origin of the pumpkin solely rest upon the seeds discovered. A whole fruit with the stem intact is incorporated in the collection. Beside the fruit, we have the strongly ribbed stems of the fruit used by the cliff dwellers as stoppers for bottles. According to the distinction made by Naudin, the stem of *C. maxima* is smooth; that of *C. Pepo* is strongly fluted and roughly corrugated. So much for botanical evidence.

That the pumpkin is indigenous is shown also by the descriptions of the early explorers and settlers, and by the fact that gourds and pumpkins were used for a great many different purposes in America. This argues for an American origin, because it takes time for a people to learn new uses of a plant, which formerly may have served only one or two purposes. For example, among the cliff-dwelling Indians gourds, using the word in a general sense, were used for bottles, as receptacles to hold feathers and cotton down used in spinning. The stems were preserved and used as stoppers. The narrow neck of the gourd dipper, if accidentally broken off, was saved and used to hold the ceremonial pollen of maize or of the tule. The larger fruits were first dried, the interior cleaned out, and were then used as water pails or as receptacles in which to store corn (*Zea mays*), beans (*Phaseolus vulgaris*) and grass seeds. Mr. Cushing describes* the gourd water bucket of the Zuni as supported by wicker work composed of fibrous yucca leaves. These are a few of the many uses to which gourds were put before the advent of the white man.

J. W. HARSHBERGER.

UNIVERSITY OF PENNSYLVANIA.

* 1882-83, CUSHING, *Report Bureau of Ethnology*, p. 483.

AWARD AND PRESENTATION OF THE RUMFORD PREMIUM.

IN conformity with the terms of the gift of Benjamin, Count Rumford, granting a certain fund to the American Academy of Arts and Sciences, the Academy is empowered to make, at any annual meeting, an award of a gold and silver medal, being together of the intrinsic value of three hundred dollars, as a premium to the author of an important discovery or useful improvement in light or in heat, which shall have been made and published by printing, or in any way made known to the public, in any part of the continent of America, or any of the American Islands: preference being always given to such discoveries as shall, in the opinion of the Academy, tend most to promote the good of mankind.

At the annual meeting of 1895 the Academy awarded the premium to Thomas Alva Edison for his investigations in electric lighting, and the presentation of the medals took place at the meeting of the 13th of May, 1896.

Vice-President Goodale, in presenting the medals, made the following remarks:

It would be highly presumptuous for one whose knowledge of physics is of the most elementary character to occupy the time of the Academy by any statement of his own in conveying these medals. Happily such a course is unnecessary. The Chairman of the Rumford Committee has placed at our command a brief statement which makes clear the ground of the award:

"The Rumford Committee voted, June 22, 1893, that it is desirable to award the Rumford medal to Thomas Alva Edison in recognition of his investigation in the field of electric lighting, and they confirmed this vote on October 9, 1893, in the following words: 'Voted for the second time to recommend to the Academy that the Rumford medal be awarded to Thomas Alva

Edison for his investigations in electric lighting.'

"The Committee reached the conclusion expressed by these votes after long deliberation and after careful sifting of all the evidence which was at their disposal in regard to Mr. Edison's claim for priority in the construction of the incandescent lamp, the conception of the central lighting station, together with the multitude of devices, such as the three-wire circuit, the disposition of the electric current feeders, and the necessary methods for maintaining the electric potential constant.

"The Committee felt that they could not decide upon Mr. Edison's claims for priority in any particular invention in this new industry. Indeed, courts of law after prolonged litigation have found it difficult to decide how far Mr. Edison was in advance of contemporary workers. The task given to the Rumford Committee to decide who is the most worthy of the Rumford medal, especially in the field of the application of electricity for the production of light and heat, is not an easy one. The number of investigators is now so large that it is no longer possible in general for one man to claim to be the first to apply electricity to a new field. The successful application is the result of many minds working on the same problem. Although the Committee did not feel justified in expressing the opinion that Mr. Edison invented the incandescent carbon filament lamp, or that he was the first to arrange such lamp in multiple on the circuit, thus producing what is popularly termed a subdivision of the electric light, or that the Edison dynamo had greater merits than the machine of Gramme and Siemens and others; still they are convinced that Mr. Edison gave a great impulse to the new industry and that he was the first to successfully install a central electric lighting plant with the multitude of practical devices which are

necessary. They believe that this impulse was due to his indefatigable application, to his remarkable instinct in whatever relates to the practical application of electric circuits, and to his inventive genius. They, therefore, have unanimously recommended to the Academy to bestow the Rumford medals upon him, feeling that the work of Mr. Edison would especially appeal to the great founder of the medals, Count Rumford, if he were living."

The Academy has accepted the report of the Rumford Committee and has voted to confer the gold and the silver medal upon Mr. Edison. The recipient finds it impossible to be present at this meeting of the Academy and has requested Prof. Trowbridge to act as his proxy and to receive the medals for him.

In the name of the Academy I beg you, Prof. Trowbridge, to accept the charge of conveying these medals to Mr. Edison's hands. It would be most ungracious for us who are assembled in this room, which is flooded by this steady and brilliant electric light, to withhold our personal thanks for what Mr. Edison's investigations and practical activities have done for us all. And, hence, I may venture to say that our thanks and all good wishes are to be conveyed with the Rumford medals.

Prof. Trowbridge replied as follows:

Mr. President and Gentlemen of the Academy: I accept the medals for Mr. Edison, and at his request I wish to express his deep sense of the great honor the Academy has conferred upon him. His work in the field of electric lighting has been the subject of prolonged litigation and at times he has had doubts in reading the opinions of learned experts whether this work has been original or whether he had really contributed anything to the world's progress. The recognition of his labors by the American Academy of Arts and Sciences, regarded by Count Rumford in his gifts as the

coequal of the Royal Society of London, is therefore especially grateful to him. Acting as his proxy I thank the members of the Academy for the distinction which they have by their votes conferred upon him.

THE AMERICAN ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE.

THE preliminary announcement of the 45th meeting, to be held in Buffalo, August 22d to August 29th, calls attention to the fact that the Association met at Buffalo in 1866, 1876 and 1886, and to the special advantages of Buffalo as a place of meeting. Most of the meetings will be held in the Buffalo High School buildings, and the Hotel Iroquois has been designated as headquarters. The first meeting of the Council will be at noon on Saturday, August 22d, and the first General Session will be held on Monday morning, August 24th. This will give Tuesday, Wednesday, Thursday and Friday as the four days entirely devoted to the reading of papers in the sections. Saturday will be given to excursions.

The meeting will be called to order by the retiring President, Prof. Edward W. Morley, Adelbert College, who will introduce the President-elect Prof. E. D. Cope, University of Pennsylvania. An Address of Welcome will be delivered by Edgar B. Jewett, Mayor of Buffalo, Chairman of the Local Committee, who will be replied to by President Cope. The address of the retiring President will be given in the evening, and in the afternoon the addresses of the Vice-Presidents, as follows:

President Carl Leo Mees, of the Rose Polytechnic Institute, before the Section of Physics, on 'Electrolysis and some outstanding problems in Molecular Dynamics.' Miss Alice C. Fletcher, Washington, before the Section of Anthropology, on the 'Emblematic Use of the Tree in the Dakotan Group.' Prof. B. K. Emerson, Amherst College,

before the Section of Geology and Geography, on 'Geological Myths.' Prof. W. E. Story, Clark University, before the Section of Mathematics and Astronomy, on 'Intuitive Methods in Mathematics.' Prof. William R. Lazenby, Ohio State University, before the Section of Social and Economic Science, on 'Horticulture and Health.' Dr. Theo. Gill, before the Section of Zoölogy, on 'Animals as Chronometers for Geology.' Prof. William A. Noyes, before the Section of Chemistry, on 'The Achievements of Physical Chemistry.' Prof. N. L. Britton, before the Section of Botany, on 'Botanical Gardens.' Prof. Frank O. Marvin, University of Kansas, before the Section of Mechanical Science and Engineering, on 'The Artistic Element in Engineering.'

It being designed to make of the Buffalo meeting practically a week of solid work, the Local Committees must, as far as possible, arrange the entertainment so as not to break in upon the business of Sections. Probably upon the evening of the first working day, Monday, August 24th, will be given the reception by the ladies of Buffalo, and a gentlemen's reception is to be appointed for some evening at the Buffalo Club. On another evening there will be a carriage drive or a moonlight ride upon Lake Erie, and the public lectures will fill out the complement of entertainment prior to the special trip of the session, which will be a general complimentary excursion for the Association to Niagara Falls, on Saturday, August 29th.

In addition to the magnificent natural scenery and its scientific aspects the power house of the Cataract Construction Company will be visited.

Several special excursions will be undertaken by the separate sections, and during the week preceding the meeting, parties will be conducted through western New York under the auspices of the Geological

Society of America. These excursions will be as follows:

Stratigraphy and Paleontology: Conductor, Prof. Charles S. Prosser, Union College. The purpose of this excursion will be to examine the several rock formations in western New York, with their characteristic fossils. The party will probably gather at Syracuse on Monday, August 17th, where the Salina, Helderberg, Oriskany and Onondaga strata are well shown. The Genesee ravine at Rochester, the streams entering the Genesee, and the gorge of the Genesee at Mt. Morris, will be especially studied.

Petrography: Conductors, Prof. James F. Kemp, Columbia University, and Prof. Charles H. Smyth, Jr., Hamilton College.

The party will meet at Port Henry on Lake Champlain, on Monday, August 17th, and spend two or three days under the guidance of Prof. Kemp, in the Lake Champlain valley and the eastern Adirondacks, visiting the quarries, iron mines, crystalline limestones, gabbros, anorthosites, bostonites and camptonites, and incidentally the Paleozoic exposures. They will then go by stage through the mountains to Lake Placid, where they will proceed by rail to Gouverneur. Prof. Smyth will conduct them to the talc mines, red hematite mines, contacts of gabbro and limestone, gneiss and other rocks of this vicinity.

Economic Geology: Conductor, Dr. F. J. H. Merrill, State Museum.

The excursion will meet at Syracuse and Rochester on Monday or Tuesday, and spend the week in a study of the mineral resources of the western part of the State. The subjects of study will be as follows: The salt fields at Syracuse and either LeRoy or Warsaw; the salt mines at Lehigh, Livonia or Retsof; the gypsum mines at Garbutt; the Medina sandstone quarries at Brockport, Albion or Medina; the 'marble' quarries at Lockport, the marl beds and

cement works at Wayland; the waterlime cement works at Akron or Buffalo.

Pleistocene Geology. Conductors, Mr. G. K. Gilbert, United States Geological Survey, Mr. Frank Leverett, United States Geological Survey, and Prof. H. L. Fairchild, University of Rochester.

The area of western New York is an exceptionally interesting field for the study of glacial and glacio-lacustrine phenomena. The party will gather at Rochester on Monday, August 17th, and spend two days in that neighborhood in observation of the drumloids, kames and moraines, and the lacustrine phenomena of the glacial lakes Warren and Iroquois. Southwest of Batavia, Mr. Leverett will take the party over the Warren beaches and their correlating moraines. The study of Niagara gorge and related features will be left until the close of the Association meeting, when Mr. Gilbert will take charge of the party.

The affiliated societies meeting at Buffalo are as follows:

The Geological Society of America will hold its eighth summer meeting on Saturday evening, August 22d, at 8 o'clock, in the Lecture Hall of the Buffalo Society of Natural Sciences, basement of the Library Building. This meeting will be for administrative business and reading of papers by title. The papers will be presented and discussed in Section E during the following week. Joseph LeConte, Berkeley, Cal., *President*; H. L. Fairchild, Rochester, N. Y., *Secretary*.

The American Mathematical Society will hold its summer meeting in the Lecture Hall of the Society of Natural Sciences, Buffalo, on August 31st and September 1st. F. N. Cole, Columbia University, New York, *Secretary*.

The American Chemical Society will hold its thirteenth general meeting in Buffalo, on Friday and Saturday, August 21st and 22d, in room on the first floor of the High School. Dr. Charles B. Dudley Altoona,

Pa., *President*; Dr. Albert C. Hale, Brooklyn, N. Y., *Secretary*.

The Society for the Promotion of Agricultural Science will hold its meetings in the Library Building, August 21st and 22d. Prof. Wm. R. Lazenby, Columbus, Ohio, *President*; F. M. Webster, Wooster, Ohio, and Herbert Osborne, Ames, Iowa, *Vice-Presidents*; Prof. Charles S. Plumb, Lafayette, Indiana, *Secretary*.

The Association of Economic Entomologists will hold its eighth annual meeting in the Library Building, August 21st and 22d. C. H. Fernald, Amherst, Mass., *President*; C. L. Marlatt, Washington, D. C., *Secretary*.

The Botanical Society of America will hold its second annual meeting in Buffalo High School, on Friday and Saturday, August 21st and 22d.

The Society will be called to order by the retiring President, William Trelease, of St. Louis, on Friday, at 3 P. M. The President-elect, Charles E. Bessey, of Lincoln, will then take the chair. The afternoon session will be devoted to business. At 8 P. M. the retiring President will deliver an address in the High School chapel; subject, 'Botanical Opportunity.' The sessions of the Society for the reading of papers will be held on Saturday, at 10 A. M. and 2 P. M., in room 16, High School. Prof. C. R. Barnes, Madison, Wisconsin, *Secretary*.

The Botanical Club of the Association will meet at 9 o'clock, Tuesday morning, August 25th, in the rooms assigned for the use of Section G (Botany). Frederick V. Coville, *President*; Prof. Conway MacMillan, *Vice-President*; J. F. Cowell, *Sec'y.* and *Treas.*

The Society for the Promotion of Engineering Education will meet in the rooms of the Engineers' Society of Western New York, Library Building, on Thursday, Friday and Saturday, August 20th, 21st, 22d. Prof. Mansfield Merriman, Lehigh University, *President*; Prof. C. Frank Allen, Massachusetts Institute of Technology, *Treasurer*.

CURRENT NOTES ON ANTHROPOLOGY.

THE BULL-ROARER, OR BUZZ.

THE value of the study of games and gaming implements to ethnology is well illustrated by a monograph which is printed in the last (ninth) volume of the *Transactions of the 'Verein für naturw. Unterhaltung,'* of Hamburg, by Prof. J. D. E. Schmeltz, the genial editor of the *'International. Archiv. für Ethnographie.'* His subject is the familiar humming toy called by our boys the buzz (German, Schwirrholtz or Waldteufel). Taking it up in the true scientific spirit, he sets about to study the various forms in which it has been made, the materials selected for its construction, the geographical localities in which its use has been reported, and the purposes for which it has been employed by various peoples. A plate is appended showing the various shapes which have been devised for it by different tribes. The result is that which is practically invariable when we examine with entire thoroughness any of these survivals from remote ancestral conditions: "We discover that one and the same implement was manufactured and connected with the same associations among tribes of the most widely different races. Does not this add another to the remarkable proofs that whether men have straight or crumpled hair, white or black skins, they are mentally so allied that their thoughts and even their follies are over and over again identically repeated?"

GEOGRAPHICAL MARKINGS ON NATIVE UTENSILS.

THE Brazilian explorer, Dr. Karl von den Steinen, calls attention in the *Ethnologisches Notizblatt*, No. 3, to a series of figures burned or scratched on the gourds used by the Lengua Indians on the Paraguay river. They represent a number of circles connected by crooked lines. Their meaning would scarcely be guessed by an observer,

but a native explained them as cartographical delineations, intended to indicate the locality where the utensil was manufactured, and the position and relative distances from it of the other villages occupied by the tribe.

This explanation seems to have valuable bearings in the interpretation of petroglyphs, and also of some of the curious markings on aboriginal pottery. It is likely that the same idea would be carried out on the soft surface of the pottery jar as on the exterior of the gourd. Some similar drawings of a topographic nature have been briefly discussed by Col. Garrick Mallery in his 'Picture Writings of the American Indians,' p. 341.

D. G. BRINTON.

SCIENTIFIC NOTES AND NEWS.

ASTRONOMY.

THE international committee having in charge the work of the Astrophotographic Chart of the Heavens met in Paris on May 11th and the following days. The proceedings of the committee related principally to the technical details of the work. The reports of the directors of the various observatories taking part in the photographic work were, however, of considerable public interest. It appears from these reports that the series of plates from the measurement of which a catalogue of all the stars down to the eleventh magnitude is to be constructed have been practically completed at nearly all the participating observatories. The second series of plates, which are to be used simply as a chart, and which will include stars several magnitudes fainter than the smallest ones admitted to the great catalogue, is also well advanced. These chart plates require a much longer exposure than the catalogue plates, and for this reason it is not possible to finish them as quickly as the others.

The measurement of the catalogue plates has progressed with satisfactory rapidity at several of the observatories, so that we may expect the first instalment of the catalogue within a very few years. The final completion of it will perhaps require twenty-five or thirty years. The

probable error of the final catalogue positions will be about one-tenth of a second of arc in either coördinate.

H. J.

THE MISSOURI BOTANICAL GARDEN.

THE seventh annual report of the Missouri Botanical Garden, recently issued, contains, in addition to the scientific papers, which we hope to notice later, the administrative reports for the year 1895. From these it appears that during the past year the maintenance revenue of the institution was \$100,042.65, of which \$86,698.09 was expended for the maintenance of the revenue property, taxes (amounting to nearly \$25,000.00), and the maintenance and extension of the Garden.

It is stated that about one-third more people visited the Garden than during the previous year, on one day over 30,000 persons having been counted. As in the two preceding seasons, the growth of the *Victoria Regia* was made a prominent feature, and excited much interest. One of the most practical and direct benefits conferred by the Garden is indicated by the statement that, as in previous years, a considerable number of bedding plants were removed from the ground and potted on the approach of cold weather, and about 800 of these were distributed to hospitals, mission schools and similar charities, about half of the number going to the kindergartens of the public-school system. The provision for experimental work in horticulture and for the adequate instruction of pupils in gardening has been increased by the planting of a carefully selected orchard and the erection of a vegetable forcing house, built on the approved commercial models.

The herbarium has been increased by the incorporation of over ten thousand sheets of specimens, and now comprises some 242,000 specimens, besides over 4,000 slides, wood specimens, etc. During the past year, \$3,764.00 was spent for purchases and binding for the library, which has been increased by 3,036 books and pamphlets during the year, so that, as now constituted, it consists of 10,030 pamphlets and 9,619 volumes. These facilities have been placed freely at the service of competent investigators, in a circular similar to one that was printed in this JOURNAL a year since, and they have been used,

as far as possible, in the botanical instruction of students in the School of Botany, of Washington University.

AGRICULTURE IN GREAT BRITAIN.

THE report of the British Board of Agriculture for 1895 is summarized in a recent issue of the New York *Evening Post*. It appears that the extent of woodlands in Great Britain is 2,726,000 acres, of which 132,000 acres have been planted in the last fifteen years. During the last year there has been a gain of about 30,000 acres. The most striking figures relate to the shrinkage in the amount of land under the plough, which was increased by the unpropitious character of the autumn seed time of 1894 and early spring of 1895. More than 510,000 acres less of wheat were grown, and 57,000 acres less of minor grain crops, rye, beans and peas. One-fifth part of the surface withdrawn from these crops or from wheat was devoted to barley and oats; but the corn land of 1895 was less by nearly 455,000 acres than that of 1894, while weather conditions, checking the preparation of the customary area for turnips and other green crops, caused a further reduction of 112,000 acres under this cultivation. The surface under potatoes, small fruit, lucerne and flax was larger by 45,000 acres, and the acreage left under bare fallow was extended by nearly 100,000 acres. The net reduction of arable land was 197,000 acres, and the net addition to the permanent pasture a little over 145,000 acres. The actual loss of arable area in the last two decades is 2,137,000 acres. The reduction of wheat-growing alone accounts for most of this loss. Under this head there was a total diminution of more than 1,900,000 acres between 1875 and 1895. More than a third of the decline in the arable area, and more than half of this reduction in wheat acreage, occurred in the last five years of the twenty. Statistics are given also of the imports of agricultural produce during the last twenty years. In value, the totals for 1895 exhibit increased imports of dead meat, poultry, eggs and lard. Live animals and dairy produce show slightly lower total values. Wheat and flour importations during the year amounted to more than £30,000,000, as against £26,755,000 in 1894, while

other grain imports were reduced. The value of live animals imported represented £8,966,000, as against a total of £9,090,000 in 1894. The average animal importations has been more than £8,500,000 for the last ten years.

GENERAL.

DR. DAVID STARR JORDAN, President of Stanford University, has been appointed President of the Sealing Commission, which will go to Alaska on the steamer Albatross to study the sealing question. Drs. Leonhard Stegner and F. A. Lucas, of the Smithsonian Institution, will accompany him. On the part of the government of the Dominion of Canada Mr. Andrew Hackett of the Fisheries Department, Professor MacGoun of the Geological Survey, and Professor Darcy Thompson, of Dundee, have left for British Columbia, on the way to Bering Sea.

THE expedition of M. Andrée embarked on June 6th from Gothenburg for Spitzbergen, from which place the expedition will proceed in the balloon.

LIEUTENANT PEARY, before starting on his expedition to the north coast of Greenland, has gone to England, his main purpose being to present an account of his important explorations in northern Greenland to the Royal Geographical Society.

M^{lle}. KLUMPKE, known for her work at the Paris Observatory, has been elected a member of the British Astronomical Association.

DR. LEOPOLD DIPPEL, director of the Botanical Gardens at Darmstadt, and professor of botany in the Technical High School, has retired.

A VALUABLE collection of animals and birds of Palestine, and of Roman coins, is offered for sale by Dr. Selah Merrill, of Andover (for many years United States Consul at Jerusalem).

THE Council of the British Medical Association has received an invitation to meet at Montreal in 1897.

THE *Lancet* states that a surgeon in the United States navy reports that in Japan among 1200 soldiers 1.58 per cent. were red blind, and 0.833 per cent. green blind. Among 373 boys 1 per cent. were red blind, and among 270 girls 0.4 per cent. Among 596 men in Kyoto 5.45

showed defective color sense. Dr. Fielde, of Swatow, China, examined 1200 Chinese of both sexes, using Thompson's wool tests. Among the 600 men were 19 who were color-blind, and among 600 women only 1. The percentage of color-blindness among Chinamen is then about 3 per cent., and does not vary greatly from that in Europeans. Dr. Fielde, however, found that fully half of those tested mixed up blue and green, and this investigator thinks that many of the race are quite blind to the violet colors.

THE thirty-first field meeting of the Appalachian Mountain Club will be held from July 3 to July 11, 1896, in the Crawford House, N. H. Sessions for the reading of papers and discussions will be arranged for evenings and for stormy days. Excursions will be made to the summit of Mount Washington and to Carrigain, Webster, Willard, Willey, Avalon, and other mountains, and possibly up the Mt. Washington river valley.

MR. E. WALTER MAUNDER, the astronomical editor of *Knowledge*, has arranged to visit Norway on board the steamship 'Norse King,' to observe the total eclipse of the sun on the 9th of August next.

THE recent tornado in St. Louis destroyed or seriously injured over 400 trees in the Missouri Botanical Garden, and several of the buildings were damaged; fortunately no harm was done to the herbarium and library. Shortly before the tornado 6,000 panes of glass were broken by a hail storm.

A PRIZE of \$50 is offered by the editor of the *Bulletins of American Paleontology*, Prof. G. D. Harris, of Cornell University, for a monograph suitable for publication in the bulletins; it must be presented before May 1, 1897.

THE Société helvétique des sciences naturelles and the affiliated societies will meet at Zurich, from August 2d to 5th.

A BI-MONTHLY mathematical journal to be edited by Prof. W. E. Storey, Clark University, is announced. The first number is now in the press and is expected to appear at once.

THE collection of American historical documents and other *Americana* made by Mr. T. A. Emmet has been presented to the New York Public Library; it is stated that the collection

cost Mr. Emmet \$300,000 and that Mr. J. S. Kennedy paid the collector \$150,000. A friend of Yale University has purchased for the library a collection of 6,000 volumes and 19,000 pamphlets relating to Scandinavia.

A SIXTEENTH section, treating alcoholism, has been added to the Moscow International Medical Congress.

ACCORDING to *The British Medical Journal* the new physiological and pathological laboratories just opened at Queen's College, Belfast, are in every way excellent, and form a valuable addition to the resources of the Belfast Medical School. Dr. Lorrain Smith, lecturer on pathology, is conducting a post-graduate course on bacteriology, which is being largely attended and highly appreciated. The Council of the College, in accordance with the new regulations of the Royal University, have founded a new lectureship in public health. Dr. Whitaker, the General Superintendent Officer of Health for Belfast, has been appointed to the post. The lectures will be extended over three months.

DURING the spring term the class in field geology in Union College, accompanied by Prof. Prosser, has spent every Saturday in studying the different formations and interesting geological structure found within a radius of fifty miles from Schenectady. The formations studied range from the Laurentian up to the Hamilton of the Devonian. Some of the localities examined are the region of Saratoga Springs, and in the Mohawk Valley, Hoffman's, Amsterdam, Tribes Hill and 'the Noses' near Spraker's. At Saratoga, Hoffman's and 'the Noses' are excellent examples of fault structure, the latter place showing the Laurentian, Calciferous, Trenton and Utica formations. To the south of the Mohawk Valley, the eastern and northern flanks of the Helderberg Mountains and Howe's Cave were visited. This region gives an admirable section of the formations represented in eastern New York from the Hudson to near the summit of the Hamilton, and is also the typical locality for a number of them. As a result of this and earlier work of the department, valuable material and data have been obtained that will be used in preparing a report, revising the geology of this region.

SINCE our last issue news has reached us of the death of the eminent English physician, Sir Russell Reynolds, who died at London on May 29th at the age of 68. He was the President of the British Medical Association, and until lately President of the Royal College of Physicians and Professor of the Principles and Practice of Medicine in University College. He made important contributions to the scientific study of diseases of the nervous system, being one of the first to apply the statistical method. He was also the editor of the first 'English System of Medicine,' which appeared in five large volumes between 1866 and 1878.

CAPTAIN JOHN G. BOURKE, United States army, died in Philadelphia on June 8th. He had a brilliant record as a soldier, but deserves mention in this place owing to his contributions to anthropology and folk-lore. He was this year President of the Folk-lore Society. It is also proper to record in this JOURNAL the death of Mr. George Munroe, the New York publisher, not only on account of his generous gifts, which included \$500,000 to Dalhousie College, Halifax, but because he was from 1850 to 1856 instructor in mathematics in the Free Church College, Halifax.

M. DAUBRÉE, the eminent geologist, has died at the age of 82. He was from 1839 to 1855 a professor at Strasburg University, whence he was called to a chair at the School of Mines and the Natural History Museum, Paris.

WE regret that we must record in this issue an unusually large number of deaths of men of science. These include Dr. Finkelnburg, of Bonn, author of important works on hygiene; M. Raulin, professor of industrial and agricultural chemistry in the University of Lyons; Mr. Richard Sims, the antiquarian; Dr. Joseph Alexis Stolz, at the advanced age of 92, a native of Alsace, who was a professor at the Strasburg Faculty of Medicine till 1871, removed with the faculty to Nancy, and retired in 1880; Sir George Johnson, F. R. S., an eminent physician and professor of clinical medicine in King's College, at the age of 78; Dr. Hosius, of Münster, professor of mineralogy, at the age of 70; Professor Schickendantz, the chemist, at Buenos Ayres; Dr. Ludwig Mark, as-

sociate professor of agriculture at Königsburg, at the age of 56, and Dr. Wilhelm Hanke, sometime professor of anatomy at Tübingen, at the age of 62.

Natural Science notes that Mr. G. A. Boulenger is one of the first to use X-rays for purposes of systematic zoölogy, having used a skiagraph to determine the more important points in the skeleton of the rare toad *Pelodytes caucasicus*, the second known species of the genus represented by a single specimen. The skiagraph showed the junction of the astragalus and calcaneum, the form and extent of the frontoparietal fontanelle, the shape of the widely-expanded sacral transverse processes and the direction of those of the lumbar.

THE *Lancet* states that an effort is at present being made to establish a museum in the historic city of Derry, Londonderry, and it is suggested that Gynn's Institution might be let for purpose of a museum at a nominal rent. There is a nucleus of a museum, which was some time ago handed over to Mr. Bernard, and at present the articles are being arranged in suitable cases. They are chiefly minerals. Moreover, several local gentlemen have private collections which would probably be forthcoming if a suitable habitation were obtained. Mr. Bernard, whose stock of relics and curios is a most valuable one, has expressed his willingness to give them to a local museum, and Sir J. A. MacCullagh has also a series of relics specially associated with the past history of Derry. It is hoped a building will soon be set apart for the museum.

UNIVERSITY AND EDUCATIONAL NEWS.

It is announced in the daily papers that Sir Donald Smith will build in Montreal a Royal College for women, at a cost of \$2,000,000.

MISS HELEN CULVER has added \$25,000 to the \$1,000,000 she had already given to the University of Chicago. This sum is to be added to the \$300,000 set apart for the erection of four biological buildings.

THE class of 1876 of Princeton University has subscribed \$15,000 towards the endowment of a McCosh professorship of philosophy.

THE scientific school of Harvard University will offer, during the summer, courses in surveying in Martha's Vineyard.

LIEUT. MURRAY, of the First Artillery, United States Army, has been appointed to succeed Capt. Pettit as professor of military tactics at Yale University.

IN addition to the fellowships in the scientific departments of Cornell University, announced in the last number of this JOURNAL, the following appointments have been made: In civil engineering, Stephen Gregory, C.E. (University of Texas); chemistry, Hector R. Carveth, A.B. (University of Toronto); physics, Arthur L. Foley, A.B., A.M. (University of Indiana). Twenty-two fellowships and sixteen scholarships are awarded annually at Cornell University.

DR. ARTHUR ALLIN has been appointed professor of psychology and pedagogy in the Ohio University at Athens.

THE *Naturwissenschaftliche Rundschau* announces the following appointments: Dr. Otto Fischer, associate professor in the University of Leipzig; Dr. Paul Eisler, full professor of anatomy in the University of Halle; Dr. L. Joubin, professor of zoölogy in the Faculty of Science at Rennes; Dr. H. Prous, professor of zoölogy in the Faculty of Science in Lille; Dr. J. A. Wislicenus, professor at the School of Forestry at Tarandt; Dr. G. Frege, full professor of mathematics at the University of Jena; Dr. H. Klinger, full professor of pharmaceutical chemistry in the University of Königsberg, and Dr. Scholl, assistant professor of chemistry at Karlsruhe.

THE following docents have recently been recognized in German Universities: Dr. v. Geitler, at Prague, for physics; Dr. Hans Bateman, at Berlin, for astronomy; Dr. Wagner, of Strasbourg, at Giessen, for zoölogy; Dr. J. Hofer, at the technical high school at Munich, for electrolysis, and Dr. Scholl, at Leipzig, for physics.

DISCUSSION AND CORRESPONDENCE.

THE HABIT OF DRINKING IN YOUNG BIRDS.

TO THE EDITOR OF SCIENCE: In response to a request that has just reached me, may I

ask for space in your columns to say that the statement I made with regard to the habit of drinking in young birds was to the following effect? The chicks that I have observed pick instinctively at any small objects at suitable distance. If a small drop of water be such an object they will peck at that. But if a shallow tin of water be placed in their run the stimulus of the sight of still water does not evoke any instinctive drinking response. If there be grains of sand or food, or other objects at the bottom of the tin, they will peck at these and incidentally find the water. Sometimes they will peck at a bubble on the brim. Sometimes when one is thus led to drink others will follow by imitation. No sooner does the beak touch the water than, in the domestic chick, up goes the head and the instinctive drinking response is shown. I have seen ducklings waddle through the tin repeatedly and not stop to drink, though I had reasons for believing that they were thirsty; for when I dipped the beak of one of them beneath the water he drank eagerly and continued to do so for some time. On the other hand a little Moor hen or water hen, when I quickly lowered it at about 16 hours old into water, drank so soon as its breast touched the surface. It then swam off with instinctive definiteness of coördinated leg-movements.

The statement of fact (so far as my observations go) that I made was this: that the sight of still water evoked no instinctive response; but that the touch of water in the bill at once evoked the characteristic instinctive behavior.

C. LLOYD MORGAN.

A SUGGESTED EXPERIMENT ON HEREDITY.

As far as I have learned, there has been as yet no series of direct experiments on natural selection and heredity of acquired characters with adult animals. The success of Mr. Waller, President Cleveland's sporting friend, in baiting wild mallards with grain on platforms at different depths, so that the ordinary mallard is forced at length to dive six feet for its food, suggests that if such ducks were carefully thus trained, segregated and bred under scientific supervision, there might come some important results as bearing on the modification of struc-

ture by environment and on heredity. For example, we might expect increased webbing of the feet, and this might become hereditary.

HIRAM M. STANLEY.

LAKE FOREST, ILL., June.

DARKENING OF THE CATHODE IN A CROOKES TUBE.

A PEAR-SHAPED Crookes tube with a cathode disc in its narrow end has been used extensively by us during the past ten weeks in private experimentation and in public lectures on Röntgen rays. In common with many other experimenters, we have observed that after much usage the glass opposite the cathode disc and the glass about the anode became darkened. But we do not recall having seen any statement recorded regarding the darkening of the cathode disc. When we began using the tube the surface of the aluminium disc was uniformly bright throughout; now there is on the surface facing the broad end of the tube a dark brown ring concentric with the disc. This ring has an internal diameter of about 6 mm., and is darkest near its inner edge, the densest portion being, perhaps, 1 mm. across. Outside of this darkest portion the ring fades off gradually toward the outer edge of the disc. Taken as a whole, the internal and external diameters of the ring are about 5 mm. and 11 mm. respectively. The circular area inside of the dark ring is the brightest part of the disc. The diameter of the disc is about 17 mm.

During the discharge through the tube we now observe what we did not notice before, viz., a pencil of faint bluish light emanating from the circular area of the disc inside the dark ring. The pencil is normal to the disc. The light resembles the blue or purplish light about the anode. The cylindrical pencil is most distinct at the disc and gradually fades away and becomes invisible at a distance from it of about 2 or 3 cm. If, by reversal of the current, the disc is made the anode, then the pencil of blue light cannot be seen, but almost the entire tube is filled with the same purplish light. Sometimes this purplish light fills the tube also when the disc is used as a cathode. In such cases the discharge at the spark gap (placed in series with the tube) is fat and noisy; the tube shows

very little fluorescence and the radiation of Röntgen rays is greatly diminished.

FLORIAN CAJORI,

WILLIAM STRIEBY,

COLORADO COLLEGE, COLORADO SPRINGS.

SCIENTIFIC LITERATURE.

Voice Building and Tone Placing, showing a method of relieving injured vocal cords by tone exercises. By H. HOLBROOK CURTIS, PH. B., M. D. D. Appleton and Company. 1896.

This latest claimant for favor in the difficult field of voice production will be found to contain much that is old to those familiar with the subject of acoustics and some that is as unexpected as it is new. The struggling pupil will find it difficult to extract the pearl of good advice from the shell of lengthy discussion. From the preface one can see that the author realizes at once the difficulty of the problem and what its solution should be, but it is doubtful if he has fulfilled the promise.

The author begins with a brief outline of the history of music, which is followed by a description of the anatomy of the larynx which is naturally all right, until he begins to discuss the operation of the various parts, and here certain discrepancies arise. For example, we are told that there is but one register, or rather that registers are 'fallacies,' and yet in attempting to discuss our control of pitch he refers to reaching a 'stage in the production of the lower register,' where, 'for any other further elevation of pitch, a complete rearrangement of the vocal apparatus is necessary.' Just exactly what the devotees of registers claim. In point of fact, however, if one has the proper use of the voice, the same muscles control the pitch from lowest to highest, without break or interruption.

The above is an example of the uncertainty in which the reader is left; registers are called fallacies, and yet they are discussed at length; they are assumed to exist and their fundamental differences in mechanism pointed out. Another statement which is very misleading, to say the least, is that air pressure in the lungs affects the pitch of the tone; "the pitch of the tone depends upon the strength of the expiratory pressure." How can we then take a tone

piano, swell it to forte and diminish it again, without getting off the pitch?

In regard to respiration an elaborate discussion leaves one in doubt as to what method to use, unless it be a slightly amplified natural breathing, which is, of course, correct. The author seems an advocate of 'chest resonance' as being very efficacious, whereas, in fact, it is extremely difficult to see how vibrations in a closed cavity of constantly changing volume can be called resonance or can reinforce a tone. A cavity to reinforce a tone must have a definite volume and opening; it must be open to the air, else how could its resonance increase the intensity of the tone outside?

Vocal resonators and their importance are well emphasized and treated, except for the inclusion of the sinuses, antra and chest among the reinforcing cavities. The latter part of this chapter is especially good.

Under 'tones and overtones' a deal of acoustics is introduced which ought to be free from such ideas as that "a simple fundamental tone is not known in music," or that "there are also lower partials or undertones."

The chapter on registers is very peculiar and inconsistent, and some remarkable ideas as to the mutual action of the vocal cords and resonant cavities are put forward which will scarcely receive the approval of physicists, even though supported by a mass of supposed evidence furnished by the stroboscope. The author is continually referring to the voice as if it were the result of reeds or membranes. The voice has a mechanism to control the length, tension and weight of the vocal cords; these are the factors which control the pitch of a string. The overtones in the voice belong to the series in which the first overtone is twice the rate of the fundamental, the second three and so on. This is the series of string overtones. The pitch of a reed depends upon its length, thickness and elasticity; the larynx has no means of varying such factors. The series of overtones given by a reed is different from that experimentally found in the voice.

We are thus forced to consider the vocal apparatus as a stringed instrument. Under tone placing we find Dr. Curtis' specialty, 'nodules of attrition' and their cure. His idea is that the

cords rub together, irritating each other, tearing each other, and even forming callous nodules. These he removes in a few hours by simple exercises. Other throat specialists have not observed these phenomena; and indeed how shall we believe a ragged or callous vocal cord could be cured by any exercises in a few hours. These ideas are fortified with numerous cuts of photographs of the vocal cords that associate none too well with the author's caustic remarks about touching up photographs to meet 'preconceived requirements.' Some of the advice given in this chapter is, however, worthy of approval.

It is rather remarkable that, after an elaborate discussion of the larynx, and breathing and the rest, the author should quote with evident approval Jean de Reske's epigrammatic statement that, '*la grande question du chant devient une question du nez.*' All we can do with the nose is to leave it open.

The chapter on voice building doubtless contains many good exercises and much good advice, inspired as it was by such a master of tone production as Madame Melba. The concluding chapter on voice figures contains numerous pretty pictures and interesting matter which is, however, foreign to the subject of the book.

There is much that is good in the book, but a desire to give a full discussion often leaves one in serious doubt as to the correct conclusions and renders it difficult for a novice to discriminate between the good and the bad.

W. HALLOCK.

Grundriss der Krystallographie für Studierende und zum Selbstunterricht. By DR. GOTTLÖB LINCK, Professor of Mineralogy at the University in Jena. Jena, Gustav Fischer. 1896. 8°. VI. and 255 pp. 2 colored plates and 482 figs.

Although the best treatises in crystallography are to be found in the German language, elementary text-books on the subject are as rare in Germany as in England or America. It is true that in nearly all books on mineralogy the principles of crystallography are discussed to some extent; and that occasionally the discussion is of value to the student. But in the great majority of cases it serves merely to bother him and to give him a distaste for that

most beautiful of all geometrical sciences—the study of the exact forms assumed by crystallizing substances.

In the little volume before us the author has endeavored to give the beginner in crystallography an insight into the subject in its various branches. The book occupies the same place in German scientific literature as does Dr. Williams's *Elements of Crystallography* (Holt & Co.) in English literature. It goes further than the latter book, however, in that it treats of the physical as well as of the geometrical properties of crystals.

The order of treatment in the volume is not quite as logical and consecutive as one would wish it to be in an elementary text-book. It opens with an 'Introduction' in which the general principles of geometrical crystallography are described (rather than discussed). In this portion of the book such subjects as coördinated axes, symmetry, zonal equations, parallel growths, twinned crystals and pseudomorphs are explained, some of which, it would seem, might better have been left unexplained until the student had mastered the characteristics of simple crystals.

The discussion of the six crystal systems occupies 132 pages—about one-half the volume. The discussion of each begins with a brief study of the symmetry of the holohedral forms; then follow the descriptions of the individual forms and of their simple combinations; and in conclusion the description of the hemihedral and tetartohedral forms. The derivation of the partial forms from the holohedral ones is not emphasized as it is in Williams's book. They are treated rather as forms in which certain planes of symmetry have disappeared.

The last 100 pages are devoted to an outline treatment of physical crystallography. The figures used here are well chosen to illustrate the text. All of them are fresh and some are entirely original. This portion of the volume deserves more extended notice than can be given it in this place, not because the subject-matter is startling in its novelty, but because the subject of which it treats is made so little of in this country, whereas, in reality, familiarity with it is indispensable to a true knowledge of the properties of crystals.

The chapters on hardness, etching and optical properties are especially interesting. Here more particularly than elsewhere will the student wish that the author had explained the logic of the conclusions reached through the study of the phenomena described. The chapter on the optical properties of crystals covers this difficult branch of crystallography in a very satisfactory general manner. The treatment is not full enough to enable the student to understand the optical methods of studying crystals, but it is sufficiently thorough to enable him to understand the principles upon which the methods are based.

The magnetic, electrical and thermal properties of crystals are next briefly referred to, and the volume closes with a condensed statement of the relations existing between crystals and their chemical composition.

On the whole, the book is an excellent introduction to modern crystallography; it is certainly the best book of its kind published in any language, and yet one cannot help feeling that the author has not produced a book that will serve 'für Studierende und zum Selbstunterricht.' In the hands of an instructor it should unquestionably serve a useful purpose and should make an excellent text-book.

The colored plates illustrate the appearance of the axial figures of crystals, the dichroism of tourmaline, etc., and the pyro-electrical properties of quartz, boracite and struvite.

W. S. B.

Chermotheca Italica Continens Exsiccat, in Situ, Coccidarum Plantis, Precipue Cultis, in Italia Occurrentibus, Obnoxiarum. Cocciniglie raccolte in Italia. Fascicolo I. PROF. ANTONIO BERLESE e DR. LEONARDI GUSTAVO. Portici. 1896. Lire 10.

For a number of years sets of dried fungi have been published by mycologists in this country and abroad. The earliest works of this description were issued in Europe. The first distinctively American effort in this direction, as I am informed by Mr. B. T. Galloway, was made by H. W. Ravenel, of South Carolina, who published his *Fungi Caroliani Exsiccati* from 1852 to 1860. Other writers, especi-

ally Mr. J. B. Ellis, Messrs. Seymour & Earle, and, in Italy, Briosi and Cavara, have carried forward this excellent work.

Nothing of the kind has heretofore been done in entomology, and, in fact, it is only in the case of scale insects that this method of publication is possible. Quite recently Dr. A. Berlese and Dr. G. Leonardi, of the Superior School of Agriculture in Portici, have begun the publication of a series of Coccidæ based upon the mycological method. The first number, which has just been issued, contains in a large octavo volume, 25 species of Italian Coccidæ of economic importance. The form of the work is exceptionally pleasing. The printed matter comprises title page, index and the full synonymy and bibliography of each species. An entire sheet is given to each species and a sufficient number of specimens in situ on the leaf or bark, as the case may be, are folded into a commodious pocket. This publication, for certainly it must be called a publication, will be greeted with great pleasure by all economic and systematic entomologists. Nothing could be done which would better facilitate the labors of both classes of workers. A number of the synonyms appear surprising, but there is at present no reason to doubt their correctness. For example, *Parlatoria pergandei* Comstock, a well known enemy of citrus trees in Florida and Louisiana, is according to the authors, identical with the European *Parlatoria proteus* of Curtis; *Mytilaspis citricola* Comstock, nec Packard, becomes a synonym of *Mytilaspis fulva* Targioni Tozzetti; and for the California red scale of the orange the authors have erected a new genus, *Aonidiella*, the full description of which appears in Berlese's 'Italian Coccidæ living upon Citrus Plants,' Part III.

L. O. HOWARD.

Hypnotism, Mesmerism and the New Witchcraft.

By ERNEST HART. New Edition. New York, D. Appleton & Co. 1896. Pp. 212. 8°.

The demand for a second edition of Mr. Hart's book within three years after its first appearance is a welcome indication that although, as Mr. Hart strikingly illustrates, 'Populus vult decipi,' a small portion of the public at least is willing to be undeceived. The main object of

the volume is to inspire a reaction against the current uncritical and pernicious devotion to a certain obscure and semi-morbid portion of psychic phenomena. Hypnotism and faith-cure and telepathy and 'Psychic Research' have been seized upon by men and women without special fitness or training for such study, and have become to these well-meaning but misguided adepts a form of new witchcraft. Not only they, but men of scientific training and wide reputation, have contributed to the general mass of error by carelessness in experimentation, and by a lack of a realization of the vast possibilities of intentional deception and unconscious self-deception inherent in such investigations. The sensational and extravagant experiments of Dr. Luys, in which he claimed to have demonstrated the action of a magnet upon hypnotized subjects, the transference of sensations from a doll to a subject, the mysterious influence of sealed drugs acting at a distance, and the like, are particularly well 'exposed' by Dr. Hart. Wooden magnets and 'unmagnetized dolls' and drugs called by false names were found to be equally effective if only the subject believed them to be what they purported to be.

The main addition to the present edition of this series of essays is the one entitled 'The Eternal Gullible,' which contains a very remarkable account of the methods pursued by by public 'hypnotists,' in London, for obtaining bogus subjects. There seems to be a training school where young men with dull moral and physical sensibilities are taught to endure the pain of needles thrust through the cheek and fingers, to drink paraffin mixture, to sing a comic song, act any part assigned by the hypnotist, 'do catalepsy,' and the like. Mr. Hart's evidence is complete and convincing, but it seems rather strange that such methods should be resorted to when the training of genuine hypnotic subjects to do these things is so simple a matter.

While the general trend of Mr. Hart's volume is to be warmly commended, it will probably weaken its own cause by its slight but appreciable overstatement. Mr. Hart records his belief in the reality of the hypnotic state and in the existence of valid and scientific in-

vestigation of such states, but the admission is hardly prominent enough to prevent the reader from forming the notion that all hypnotic research is humbug and deception. Indeed, in the preface to the second edition, Mr. Hart goes so far as to say "Hypnotism, when it is not a pernicious fraud, is a mere futility which should have no place in the life of those who have work to do in the world." Such a statement entirely overlooks the large number of critically authenticated cases of the therapeutic application of hypnotism; it ignores the significant and important contributions to the understanding of psychological principles that have sprung from this study. As a popular fad or amusement such topics are certainly pernicious in the extreme; but it will hardly do to associate with this the painstaking and scientific investigations of able and discerning experts.

JOSEPH JASTROW.

SOCIETIES AND ACADEMIES.

ENTOMOLOGICAL SOCIETY OF WASHINGTON,

JUNE 4, 1896.

MR. ASHMEAD exhibited a specimen of the genus *Cardiochiles*, of Nees, and announced its identity with Say's genus *Toxoneura*. It has priority and forms the type of a subfamily distinct from the *Microgasterinæ*.

Mr. Howard exhibited specimens of an adult and cocoon of *Attacus jorulla* Westwood, to which he had referred in a note in *SCIENCE*, of May 29th.

Mr. Schwarz exhibited specimens of *Atimia confusa* Say, a Longicorn beetle previously taken in the Lake Superior region, District of Columbia and northern Texas, the food habits of which were unknown until recently. He had found it attacking Juniper in the District of Columbia. He also exhibited specimens of *Lachnosterna cribrosa* from Texas.

Mr. Marlatt presented a paper entitled 'Notes on Texas Insects,' relating to some of the common insects of southwestern Texas which he had collected in April and May of the present year. The collecting had proved to be poor, owing to a severe protracted drought, and was only fair in such of the arroyos as had not been pastured by stock.

Mr. Schwarz presented for publication a paper entitled 'Notes from Southwestern Texas, No. IV; Food-plants and habits of some Texan Coleoptera,' in which he particularly described the coleopterous fauna of the Mesquite and Cactus. In discussing this paper Mr. Marlatt referred to the flowering *Opuntias* of the dry plains of Colorado and Kansas as affording extremely rich collecting fields, while the same plants in southern Texas did not offer the same opportunity to collectors. This was explained by Mr. Schwarz as due to the fact that the Mesquite and *Opuntia* flower simultaneously in Texas, and the former proves more attractive to the insects and draws them away from the Cactus. Some discussion ensued upon the superstitions regarding various insects pervading southwestern Texas, some of which were said by Mr. Schwarz to be probably of very ancient origin. Both the speaker and Mr. Marlatt referred to the dread of the inhabitants of the common *Pasimachus californicus* and *P. duplicatus*. These harmless ground beetles are known to the Mexicans as the 'cucurazza' and are supposed to be extremely poisonous, while in certain localities the English-speaking people know the *Pasimachus* as the 'shear-bug' and state that it is very injurious to grapevines and vegetables by cutting young plants, a statement which is fully as erroneous as the one made by the Mexicans.

L. O. HOWARD,
Secretary.

CHEMICAL SOCIETY OF WASHINGTON.

THE eighty-eighth regular meeting was held Thursday, April 9, 1896. The Society was called to order at 8 p. m. by the President, Dr. A. E. de Schweinitz, with thirty members and ten guests present. The first paper was by Mr. V. K. Chestnut upon 'Some Vegetable Skin Irritants and their Chemical Composition.' The paper consisted of a review of the work of Dunstan and Miss Boole on croton oil, and of Pfaff on Toxicodendrol—a new oil-like body from the poison ivy, *Rhus radicans*; together with an account of some vesicating plants which have been but little studied. Specimens of this plant were exhibited, and the effect of an alcoholic solution of lead acetate as an antidote to

Rhus poisoning was illustrated by experiments carried out by the writer on himself. These experiments also showed conclusively that toxicodendrol was the vesicating principle of the poisonous species of Rhus.

Mr. Ewell read the second paper of the evening on 'The Effect of Acidity on the Development of the Nitrifying Organs,' by E. E. Ewell and H. W. Wiley. While it has been known for many years that active nitrification occurs only in the presence of some basic substance capable of neutralizing the free acid as fast as it can be formed, very little time has been devoted to the study of the exact degree of acidity that the nitrifying organisms can endure. As the authors had some forty samples of soil at their disposal during the last year for other purposes, it seemed wise to improve the opportunity to test the influence of acidity on the nitrifying organisms contained in the soils from various parts of the country. Tests were made with forty-four different soils, from twenty-two States and Territories. The results showed great uniformity in the relation to acidity of the organisms contained in the various soils. Excluding five tests in which no nitrification, and five tests in which it was excessive because of the calcareous nature of the soils used for the seeding of the cultures, the average amount of nitrogen nitrified was twenty parts per million; the minimum result of the thirty-four tests included in this average was eleven, and the maximum twenty-five parts per million. The tests are to be repeated with pure cultures of the nitrifying organisms of the same soils. This series of experiments was made as a study of the nitrous organisms only, but the results show that the organisms are not more sensitive to acidity than the nitrous organisms, the final product being nitrate in nearly every case.

The third paper was on 'The Chemistry of the Cactaceæ,' by E. E. Ewell. Until very recently other species of cacti than *Cereus grandiflorus* and a few related species have generally been regarded as devoid of constituents of pharmacological value. These and other species have been used in medical practice in the countries in which they grow, but their use has rarely extended to the more civilized nations. Species of the genus *Anhalonium*

have long been used for curative and ceremonial purposes by the Indians of Mexico and the southwestern parts of our own country. They found place in the Mexican pharmacopeia of 1842, under the name of 'pellote,' or 'Peyotl,' but have been omitted from the later editions. The dried aerial portions of species of *Anhalonium* figure in the commerce of our southwestern border under the name of 'mescal buttons.' The species of this genus have been the subject of scientific investigation by at least three groups of persons during recent years: First, a group of persons at Berlin, where the work was begun by Dr. L. Lewin, the crude material being supplied to him by Messrs. Parke, Davis & Co., of Detroit; second, a group of persons at the Pharmacological Institute at Leipzig, where the work has been conducted by Dr. Arthur Heffter; third, a group of persons in this country, centering in the Bureau of American Ethnology and including as associates the Division of Chemistry of the United States Department of Agriculture for chemical studies, Drs. Prentiss and Morgan for a study of physiological properties, and the Botanical Division of the United States Department of Agriculture for the settlement of botanical questions.

In this country the separation of the constituents of these plants, and the study of the action of the substances thus obtained, as well as of the crude materials, upon men and the lower animals, were begun in the autumn of 1894, but before receiving the paper of Heffter. *A. lewinii*, in the form of 'mescal buttons,' has served as the material for these studies. Anhalonin and a second alkaloid have been separated in considerable quantity. A complete chemical study of the constituents of the plant is in process, including those substances of interest to the vegetable physiologist as well as those of interest to the therapist. The paper was illustrated with specimens of the cactus of different varieties from the Botanical Gardens and the Department of Agriculture.

Mr. Mooney followed with a paper on 'The Mescal Ceremony among the Indians.' The mescal plant is a small variety of cactus, native to the lower Rio Grande region and about the Pecos River in eastern New Mexico. The

botanical name has finally been fixed by Prof. Coulter as *Lophophora Williamsii*. Mescal is the name by which it is known to the Indian traders, but it is not to be confounded with the other mescal (Maguey) of Arizona. The local Mexican name is *peyote*, a corruption of the original Aztec name, from which it would seem that the plant and ceremony were known as far south as the valley of Mexico, at a period antedating the Spanish conquest. Several closely related species are described by Lumboltz as being used with ceremonial rites among the tribes of the Sierra Madre. The dried tops, when eaten, produce such marked stimulating and medicinal results and such wonderfully beautiful psychologic effects, without any injurious reaction, that the tribes of the region regard the plant as the vegetable incarnation of the Deity, and eat it at regular intervals with solemn religious ceremony of song, prayer and ritual. The ceremonial and medicinal use of the plant was first brought to public notice by James Mooney, in a lecture delivered before the Anthropological Society of Washington in 1891, as a result of studies made among the Kiowas and associated tribes of western Oklahoma. As the ceremony is forbidden, and the trade in the plant made contraband upon the reservations, the investigation was a matter of some difficulty. In 1894 Mr. Mooney brought back a large quantity of the dried mescal, which was turned over to the chemists of the the Agricultural Department for analysis, and to Drs. W. F. Prentiss and F. P. Morgan, of Washington, for medical experimentation. The results thus far would seem to indicate that the Indians are right in asserting that they have discovered in the mescal a valuable medicine entirely unknown to science, and which will probably take its place in our pharmacopeia along with those other Indian remedies, quinine and coca. The ceremony and songs were briefly described by Dr. Mooney, whose full investigation of the subject will ultimately appear in one of the publications of the Bureau of American Ethnology.

Dr. Francis P. Morgan followed with a paper on the "Physiological Action and Medicinal Value of *Anhalonium lewinii* ('Mescal Buttons')." Dr. Morgan stated that the investiga-

tion had been intrusted to Dr. D. W. Prentiss, with whom he was associated. Experiments were tried and observations taken at regular intervals to determine the action of the entire button on the system. The most striking result was the production of visions of the most remarkable kind with the eyes closed, and especially so in the dark. Changes of color were characteristics; tubes of shining light, figures, cubes, balls, faces, landscapes, dances and designs of changing colors were among the most persistent visions. They were hardly seen with the eyes open; in full dose no effect on the reason or will is noticed in most cases. There was direct stimulation of the centers of vision and dilatation of the pupils. About one quarter of the quantity, or three buttons, are sufficient to give the visions in the case of white men. Dr. Morgan detailed the experiences of different persons who had tried the experiments. In some cases there was slowing of the heart, from 75 to 45 beats, followed by a rise to normal; there is also inability to sleep, and a loss of the sense of time, hours seem to intervene between words. The physiological action is not identical with that of any known drug; it is unlike cannabis indica, cocaine, etc. The constituents of the mescal buttons are being experimented with, but the investigations are still incomplete. Anhalonine causes increased reflex irritability and convulsions, like strychnine. It is, however, evidently not the active principle. Another constituent has been isolated whose action is widely different. It does not cause opisthotonos nor tetanus, and has no action like that of strychnine. A third principle has also been isolated. The resin is supposed to be the active principle and will probably be of use in medicine. The experiments are still being conducted and will be detailed later on.

A. C. PEALE,
Secretary.

CHEMICAL SOCIETY OF WASHINGTON.

THE eighty-ninth regular meeting was held Thursday, May 14, 1896. President Dr. de Schweinitz in the chair; twenty-three members present. Messrs. Mayville W. Twitchell and Charles N. Forrest were elected to membership. The Society adopted an address to the

Senate of the United States, protesting against the enactment of any legislation upon the subject of vivisection. The following papers were read: 'Practical Analytical Accuracy,' by Frederic P. Dewey; 'A new Mode of Formation of Tertiary and Quaternary Phosphines,' by P. Fireman; 'Metaphosphimic Acids,' by H. N. Stokes.

The Society adjourned until November.

A. C. PEALE,
Secretary.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, JUNE 2.

PROF. EDWARD D. COPE made a second report on his study of the remains of extinct animals found in the Port Kennedy Bone-Fissure. Five species of reptiles and three of birds had been found while forty species of mammals, the distribution of which was given, had been determined. *Megalonyx Wheatleyi* is represented by at least fifty-five individuals, the cave bear being of the next most frequent occurrence, remains of twenty-five individuals having been collected and twelve of the mastodon, the latter mostly young. *Mylodon* is not included in the list, although a trace of its presence was found on the occasion of an earlier exploration. Evidence was at hand that *Megalonyx dissimilis* had been founded on the lower teeth of *M. Jeffersonii*. An evolutionary series of the teeth of *Phenacodus*, *Fiber*, *Isodelta* and *Microtus* was described. A porcupine formerly regarded as distinct may belong to an existing species. Four species of skunks of two distinct genera, one of them new, *Osmotherium*, *rectangulare*, were described. A tooth formerly described as belonging to a hyæna must be referred to *Uncia Merceri*. The horse of the collection is *Equus complicatus*. Other species indicated by the remains were described and classified. Only seven of the forty-eight species determined can be said to be the same as existing forms. The opossum and raccoon are entirely absent, although abundantly present in the Post-Champlain caves. A Tennessee cave had recently been proven by Mr. Mercer to be intermediate between that at Port Kennedy and those of more recent date. It contained no remains of man.

The age of the Port Kennedy Fissure was debated by Messrs. Heilprin and Cope.

Dr. Harrison Allen described an interesting skull of a young Sandwich Islander from which some of the teeth on the left side had been knocked out at maturity, probably in commemoration of the death of a chief. The superior maxilla of the edentulous side exhibits osteoporosis and the temporal muscle was evidently weakened. Other evidences of the effect of disuse even after maturity had been attained were pointed out, furnishing an important illustration of the effect of nutrition and external agencies on structure.

Mr. F. J. Keeley exhibited microscopic preparations of a fragment of supposed jade taken from a carved Mexican figure in the Museum of the Academy and others of genuine jade for comparison. The Mexican mineral was found to possess none of the characters of true jade. The subject is of importance from an ethnological point of view.

EDW. J. NOLAN,
Recording Secretary.

NEW BOOKS.

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Lehrbuch der ökologischen Pflanzengeographie. DR. EUGEN WARMING. Berlin, Gebrüder Borntraeger. 1896. Pp. xii+412.

The Magnetic Circuit in Theory and Practice. DR. M. DU BOIS, translated by DR. ATKINSON. Longmans, Green & Co., London, New York and Bombay. 1896. Pp. xviii+366.

The Gypsy Moth. EDWARD M. FORBUSH and CHARLES H. FERNALD. Boston, Wright & Potter Printing Co. 1896. Pp. xii+495+c.

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Missouri Botanical Garden. Seventh Annual Report. St. Louis Mo., Published by the Board of Trustees. 1896. Octavo pages 1-209, plates 1-66, and 6 unnumbered plates.